

“Express Mail Label” Number: EV018411721US

Date of Deposit: December 27, 2001

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**PATENT  
DOCKET NO. P1395**

**PATENT APPLICATION**

**METHOD AND SYSTEM OF FLEXIBLE PACKAGING FOR CONTAINMENT OF  
LIQUID AND GASEOUS FLUIDS**

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**RELATED APPLICATION**

**[0001]** This application claims priority to China Utility Model Application Number 01215689.2 filed March 17, 2001, the entire content of which is incorporated herein by reference.

**TECHNICAL FIELD**

**[0002]** The present invention relates generally to systems for storing and dispersing fluids. It further relates to a flexible, reusable container for liquids such as cleansers, emulsifiers or gaseous fluids.

**BACKGROUND ART**

**[0003]** Various soap products and packaging are currently available to the consuming public, from traditional bars of soap to containers for liquids such as soap or shampoo. Traditionally, such containers comprise rigid or semi-rigid structures have twist-off caps, pumps or other such means for selectively dispensing its contents.

**[0004]** The packaging means of the prior art and current art, however, suffer from considerable disadvantages. In the case of bar soap, for example, the paper wrapper or cardboard box used for shipping will not withstand prolonged contact with water. Therefore,

the soap must be removed from packaging prior to use. Once the soap is exposed to water, however, it quickly dissolves, minimizing the potential to use the soap at will and without waste. Another difficulty arises with regard to traveling. Once the package of soap has been opened and used, new packaging must be located and used to transport the soap on the return trip. Alternatively, the soap is disposed of accordingly after one use, resulting in significant expenditure versus the benefit of one use.

**[0005]** Alternatively, the generally rigid structure of plastic containers for liquid soap provides water-resistant qualities; and, therefore, preserve the soap for use over an extended period of time. These containers, however, are not conducive to economical manufacturing processes, shipping processes or storage. For example, unwieldy bottles of shampoo must be manufactured and assembled with both a container body and a pump mechanism. Upon shipment, the available volume of space within a shipping crate cannot be fully utilized due to the inability of the shampoo bottles to conform to the space available. Further, the rigidity of the bottles requires prophylactic packing measures such as additional packing material to prevent breakage of the bottles and leakage of their contents during shipping or traveling.

**[0006]** The design and structure of the prior art bottles do not facilitate multiple uses or reuses; therefore, the cost/investment per unit is relatively high; e.g., once the consumer uses all the shampoo, the consumer disposes of the bottle. Conditions of use are less than ideal with such containers, as well. For example, shampoo bottles with detachable caps which are susceptible to loss, due to the relatively small size of the cap and the degree of difficulty associated with manipulation of the same. Additionally, the bottles are not easily located within a shower stall or bath area due to lack of a suitable shelf or other support fixtures.

**[0007]** What is needed, therefore, is a multipurpose, durable container for fluids that is economical, ergonomical and easily given to packaging, shipping and handling. Further, the packaging should provide content protection in various environments and promote extended, economical use of its contents. It is also desirable to provide such a system that facilitates easy storage, usage and reuse for various purposes by a consumer. Finally, recyclable properties would prove valuable for environmental benefit.

#### SUMMARY OF THE INVENTION

**[0008]** The present invention addresses the shortcomings of the current art by provision of a container and method for storing fluids, including cleansers, emulsifiers and other liquids, wherein the container provides for after use as inflatable toys, decorative accessories,

and so forth. Further, the container is readily and economically manufactured, shipped and stored.

**[0009]** The container and method also contemplates various aesthetic features to enhance broad market appeal. For example, various embodiments may be designed and constructed according to a variety of geometric shapes. Various embodiments contemplate translucent or transparent qualities for viewing of various colors of soap, soaping having glitter, and the like. Certain embodiments contain decorative designs or messages on the packaging. Various embodiments contain inserts, such as miniature ornamental objects depicting for example flowers or tiny goldfish.

**[0010]** In one embodiment of the present invention, a container includes at least one flexible member forming a chamber therein, the at least one flexible member having a modulus of elasticity conducive to liquid containment and gaseous inflation of the at least one flexible member; and means for selective flow restriction, such that the container is capable of repetitive use for both liquid containment and gaseous inflation.

**[0011]** A method according to the present invention includes the steps of providing at least one flexible member forming a chamber therein, the at least one flexible member having a modulus of elasticity conducive to liquid containment and gaseous inflation of the at least one flexible member; and providing means for selective flow restriction mechanically associated with the at least one flexible member, wherein in the means for selective flow restriction selectively permits repetitive transfers of liquid and gaseous fluids into and out of the chamber.

**[0012]** Further advantages of the invention are brought out in the following portions of the specification, wherein the detailed description is for the purpose of fully disclosing preferred embodiments of the invention without placing limitations thereon.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0013]** FIG. 1 illustrates a container according to the present invention;

**[0014]** FIG. 2 illustrates the container illustrated in Figure 1 having the flow restriction mechanism in a closed, extended position;

**[0015]** FIG. 3 illustrates the container illustrated in Figure 1 having the flow restriction mechanism in a closed, retracted position;

**[0016]** FIGS. 4-6 illustrate containers of various geometric shape and content according to the present invention;

**[0017]** FIG. 7 illustrates a container having decorative inserts therein according to the present invention; and

**[0018]** FIG. 8 illustrates another embodiment of a container according to the present invention; and

**[0019]** FIGS. 9 – 10 illustrated isolated portions of the container illustrated in Figure 8.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0020]** The present invention provides a unique, flexible container having the property of recoverable deformation. The container provides a suitable repository for liquids as well as an inflatable member for toys, aesthetic decorations and the like. Notably, the container provides for multiple, sequential reuse for liquids and gaseous fluids. It is contemplated that various embodiments of the present invention represent a broad range of characteristics, such as shapes, colors, designs, patterns, and inserts.

**[0021]** Referring now to the drawings, wherein like elements are referenced using the same numeral, and with reference to Fig. 1, there is shown generally at 10 a container according to the present invention. The container 10 includes at least one flexible member 12 and means for flow restriction 14. The flexible member 12 may be integrally formed from a single piece of material from a predetermined design to form a chamber 16 therein. Alternatively, a plurality of flexible members 12 may be joined to form the chamber 16. Means for hanging 18 are attached to or integrally formed from the flexible member 12. It is contemplated that once formed, the container 10 will selectively retain both gaseous and liquid fluids. For example, the container 10 may be initially filled with liquid soap and distributed to a consumer. Once emptied, the container 10 may be filled with air and adopt the function of a toy or ornamental decoration.

**[0022]** It is contemplated that the container 10 comprises a material that offers inflatable properties whereby a container 10 with an empty chamber 16 is easily compressed and flattened for mass manufacturing, stacking, shipping and the like. Once filled with a fluid, the container 10 expands somewhat while retaining its basic characteristic shape, thus providing a recognizable shape according to a predetermined plan. After emptying the container 10; i.e., deflating the container 10, its recoverable deformation properties permit it to be reused by refilling the chamber 16 with the same or another fluid. For example, an

emptied container initially used for soap, may be rinsed and filled with air to form a beach toy or ornamental decoration.

**[0023]** A polymeric material such as polyvinylchloride (vinyl) is generally preferred for the flexible member 12. In a preferred embodiment, the vinyl generally has an elasticity modulus conducive to liquid containment and gaseous inflation. For example, a material may be used where an initial strain placed on the material (deformation) is proportional to stress (force per unit area). This strain is reversible (elastic) when the stress is removed. Stresses introduced beyond the transition point will not introduce a permanent deformation, and the preferred material will substantially recover to its original shape. Therefore, the material of the container provides enough elasticity to generally prevent harm to persons or itself if dropped or misplaced, as compared with rigid plastics containers and the like. The container is also durable enough to withstand a moderate degree of force without leakage or breakage when the chamber 16 is filled, such as a force exerted upon it during the general rigors of packing and shipment. Additionally, the container may be inflated with air to produce a toy, decorative object or the like. A skilled artisan will recognize that any material or combination of materials may be used so long as the functionality described herein is carried out.

**[0024]** Means for flow restriction 14 for the container 10 include any suitable device for selectively filling or emptying the chamber 16. It is contemplated that the means for flow restriction 14 may be removably or permanently attached to the flexible member 12, or integrally formed therewith. In various embodiments, the means for flow restriction 14 include a valve as shown in Figs. 2 and 3. The valve includes a stem 20, stopper 22 attached to the stem 20 and a gasket 24 for reinforcement. The valve 14 may be selectively retractable, and is shown in Fig. 2 in a closed, extended position whereby the stem 20 and stopper 22 are positioned to facilitate efforts to fill the chamber 16; e.g., by respiration. When it is desirable to seal the chamber 16, the stopper 22 may be inserted into the stem 20, which is then pushed inward into the chamber 16 in a retracted position, as shown in Fig. 3. This position prevents leakage from the chamber 16 and facilitates manipulation of the container itself without interference from the stem 20; e.g., during handling, packing and shipping operations.

**[0025]** Turning now to Figs. 4-7, there are shown various geometric shapes, designs and content according to the present invention. Various embodiments are designed and constructed in accordance with predetermined plan as animals, geometric shapes, flowers,

and so forth for consumer appeal. Further, various embodiments utilize materials having various opaque, translucent or transparent qualities to enhance marketability. For example, and as shown in Fig. 4, the container 10 having a hanger 18 is artfully designed in the shape of the sun, and formed from a transparent material. The container 10 is then filled, for example, with a bath gel of amber tint. When hung a bathroom window, the sun's rays pass through, providing a whimsical representation of the sun while functioning as durable, water-resistant packaging for the bath gel. With reference to Figure 5, there is shown a container 10 shaped as a dolphin. A skilled artisan can appreciate the many and varied uses for the container, including containment and display of liquid soap, gel, shampoo, lotion, bath and body oil, bubble bath solution, and a myriad of other liquid cleansers, emulsifiers and the like.

**[0026]** Various embodiments such as that illustrated in Fig. 6 include one or more designs (not shown) disposed upon an outer surface 12 of the container 10. The design may include a message having printing, such as an advertisement or the ingredients associated with the contents of the container 10. Alternatively, the design may be formed as an integral part of the flexible member 12.

**[0027]** Still other embodiments, such as that illustrated in Fig. 7, contain one or more inserts 10a. The insert 10a may, for example, be suspended in the liquid-filled chamber 16 for decorative reasons, utilitarian purpose or a combination of both. The inserts may be of a predetermined size that prevents or permits expulsion of the insert from the container via the valve. In the former case, for example, fabricated flowers or decorative inserts may be used, as shown in Fig. 7.

**[0028]** Yet other embodiments include the elastic features of the flexible member 12 as well as a specific valve configuration, as illustrated in Figs. 8-10, wherein the container 10 with flexible member 12 and means for flow restriction 14 having a bag opening 28. The bag opening 28 includes a flared portion 30 at the end in connection with the flexible member 12, the other end of the bag opening 28 having a circular hole with a cylindrical hollow space 32 therein. The cylindrical hollow space 32 has a sealed end extending in to the flared portion 30 and a slim slit 36 adjacent to the sealed end; the other end of the cylindrical hollow space 32 is opened and extended out of the flexible member 12 as an outlet for the contents of the container 10. A plug 34 is provided at the edge of the outlet. The whole bag opening is integrally formed. When filling the bag with, for example, liquid cleanser, the plug 34 is removed and the flexible member 12 can be filled with the liquid cleanser. After the flexible

member 12 is full, the exterior pressure is removed and thus the slim slit 36 will become closed under the liquid pressure from the liquid cleanser in the container 10, and the container is further closed by the plug 34. During application, the plug 34 is removed, and the user squeezes the flared portion 30 of the bag opening 28 such that the slim slit 36 is transfigured and opened and thus, the liquid cleanser flows out of the container 10. After using, the force from the consumer is removed, the slim slit 36 is closed again by the liquid pressure of the liquid cleanser in the container 10. The container 10 is further closed by the plug 34. Thus, under liquid pressure from the liquid cleanser within the container 10, the slim slit 36 will remain closed even if the plug 34 is opened by accident and its contents will not splash out, making this embodiment very convenient and safe for use. The above action may be repeated for repeated applications of the container 10.

**[0029]** Having illustrated and described the principles of the system and method of the present invention in various embodiments, it should be apparent to those skilled in the art that the embodiment can be modified in arrangement and detail without departing from such principles. For example, the physical manifestation of the container may be changed if preferred. Therefore, the illustrated embodiments should be considered only as example of the invention and not as a limitation on its scope. Although the description above contains much specificity, it should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments of this invention. Thus the scope of this invention should be determined by the appended claims and their legal equivalents. Further, it is appreciated that the scope of the present invention encompasses other embodiments which may become obvious to those skilled in the art, and that the scope of the present invention is accordingly to be limited by nothing other than the appended claims, in which reference to an element in the singular is not intended to mean “one and only one” unless explicitly so stated, but rather “one or more”. All structural and functional equivalents to the elements of the above-described preferred embodiment that are known to those of ordinary skill in the art are expressly incorporated herein by reference and are intended to be encompassed by the present claims. Moreover, it is not necessary for a device or method to address each and every problem sought to be solved by the present invention for it to be encompassed by the present claims. Furthermore, no element, component, or method step in the present disclosure is intended to be dedicated to the public regardless of whether the element, component, or method step is explicitly recited in the

claim. No claim element herein is to be construed under the provisions of 35 U.S.C. 112, sixth paragraph, unless the element is expressly recited using the phrase “means for”.

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